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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/633,935

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Ronald E. Malmin

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EXAMINER

HANNAHER, CONSTANTINE

ART UNIT

PAPER NUMBER

2884

DATE MAILED: 01/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

3K

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/633,935	MALMIN, RONALD E.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Constantine Hannaher	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 7-15, 18, 19 and 21-25 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-15, 18, 19 and 21-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a) ☐ All    b) ☐ Some \*    c) ☐ None of:
    - 1. ☐ Certified copies of the priority documents have been received.
    - 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION****Claim Rejections - 35 USC § 103**

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 22, 5, 7-10, 21, 11, 13-15, 18, 23-25, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) in view of Miraldi (US003688113A).

With respect to independent claim 1, Zeng discloses a gamma camera 22 comprising a plurality of elongated bar detector strips 106 made of scintillating material (in the alternative embodiment in which the dimension  $C_y$  of detector elements 106 is substantially the same as the dimension  $W_y$  of the slats 102, the fabrication from a scintillating material as described at column 7, lines 31-35 would constitute a "bar" within the meaning of the claim) arranged in a stack configuration (Fig. 4), at least one solid-state photodetector coupled to the stack of bar detector strips 106 (column 7, lines 34-35), and a slat collimator 100 including a plurality of elongated slats 102 for collimating each of the plurality of bar detector strips 106 to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of bar detector strips 106 as a choice within the ordinary skill in the art (column 7, lines 34-35). Miraldi shows (Fig. 7) that the optical communication between an elongated bar detector 86 and a photodetector 96, 98 in a tomographic device (gamma camera) by coupling of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. Since there are only six sides to a parallelepiped bar as shown by Zeng at 106 (or to a stack thereof)

and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack or to the sides of the strips facing the collimator slats and in view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating 92 as disclosed by Miraldi to guide light to the ends), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera 22 were coupled to at least one end of the stack of bar detector strips 106.

With respect to dependent claim 2, Zeng discloses that each bar detector strip 106 is in optical communication with an appropriate photodetector (column 7, lines 31-35). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made, in view of the suggestion of Miraldi, to modify the gamma camera 22 of Zeng to further comprise a plurality of photodetectors each coupled to at least one end of each bar detector strip 106 of the stack.

With respect to dependent claim 4, Zeng discloses that the photodetectors are photodiodes.

With respect to dependent claim 22, Miraldi suggests photodetectors 96, 98 are coupled to both ends of the bar detector strip 86. It would have been obvious to one of ordinary skill in the art at the time the invention was made to couple each of the bar detector strips 106 in the stack of the gamma camera 22 of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to dependent claim 5, Zeng discloses that the bar detector strips 106 are formed of CsI (column 7, line 34).

With respect to dependent claim 7, Zeng discloses each bar detector strip 106 is located between individual slats 102 of the slat collimator 100 (column 7, lines 23-26).

With respect to dependent claim 8, each of the individual slats **102** in the gamma camera **22** of Zeng has a length  $W_y$  matching the length  $C_y$  of the bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 9, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of bar detector strips **106** (Fig. 4).

With respect to dependent claim 10, see the explanation of the rejection against claim 8, and further the spacing  $G$  between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension  $C_x$  of the bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and  $2C_x=2G$ ).

With respect to dependent claim 21, Miraldi suggests photodetectors **96, 98** are coupled to both ends of the bar detector strip **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to couple the stack of bar detector strips **106** in the gamma camera **22** of Zeng to at least a second photodetector at a second end of the stack as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 11, Zeng discloses a gamma camera **22** comprising a plurality of elongated bar detector strips **106** made of scintillating material (in the alternative embodiment in which the dimension  $C_y$  of detector elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, the fabrication from a scintillating material as described at column 7, lines 31-35 would constitute a "bar" within the meaning of the claim), at least one solid-state photodetector coupled to each bar detector strip **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of bar detector strips **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along

dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35). Miraldi shows (Fig. 7) that the optical communication between an elongated bar detector **86** and a photodetector **96, 98** in a tomographic device (gamma camera) by coupling of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. Since there are only six sides to a parallelepiped bar as shown by Zeng at **106** and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the strip or to the sides facing the collimator slats and in view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera **22** were coupled to an end of each of the bar detector strips **106**.

With respect to dependent claim 13, Zeng discloses that the photodetectors are photodiodes.

With respect to dependent claim 14, Zeng discloses that the bar detector strips **106** are formed of CsI (column 7, line 34).

With respect to dependent claim 15, Zeng discloses each bar detector strip **106** is located between individual slats **102** of the slat collimator **100** (column 7, lines 23-26).

With respect to dependent claim 18, each of the individual slats **102** in the gamma camera **22** of Zeng has a length  $W_y$  matching the length  $C_y$  of the bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 23, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of bar detector strips **106** (Fig. 4).

With respect to dependent claim 24, see the explanation of the rejection against claim 18, and further the spacing  $G$  between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension  $C_x$  of the bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and  $2C_x=2G$ ).

With respect to dependent claim 25, Miraldi suggests photodetectors **96, 98** are coupled to both ends of the bar detector strip **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to couple each of the bar detector strips **106** in the gamma camera **22** of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 19, Zeng discloses a method of obtaining tomographic images (column 1, lines 12-13) of an object **200** (Fig. 6) corresponding to the illustrated gamma camera **B** (Fig. 1) which would comprise the steps of obtaining a plurality of sets of planar integral scintillation event data from the object **200** at a plurality of azimuth angles (column 8, lines 23-34) of a rotating scintillation detector (*e.g.*, Fig. 4 and column 7, lines 31-35) for each of a plurality of gantry angles of a gamma camera **22** (column 8, lines 6-21) and reconstructing the plurality of sets of planar integral scintillation event data to form a tomographic image of the object **200** (column 8, lines 43-56). The scintillation detector **22** includes a plurality of elongated bar detector strips made of scintillating material (in the alternative embodiment in which the dimension  $C_y$  of detector elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, the fabrication from a scintillating material as described at column 7, lines 31-35 would constitute a "bar" within the meaning of the claim), at least one photodetector coupled to each bar detector strip **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of bar detector strips **106** to receive gamma photons (column 1, lines 13-14) in only a single

dimension (along dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35). Miraldi shows (Fig. 7) that the optical communication between an elongated bar detector **86** and a photodetector **96, 98** in a tomographic device (gamma camera) by coupling of the photodetector to an end of the bar detector strip (and thus normal to the elongated dimension) has long been known. Since there are only six sides to a parallelepiped bar as shown by Zeng at **106** and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the strip or to the sides facing the collimator slats and in view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera **22** were coupled to an end of each of the bar detector strips **106**.

3. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) and Miraldi (US003688113A) as applied to claims 2 and 11 above, and further in view of Iwanczyk *et al.* (US006521894B1).

With respect to dependent claims 3 and 12, the photodetectors in the gamma camera suggested by Zeng and Miraldi are “appropriate” (column 7, line 35). Iwanczyk *et al.* discloses that silicon drift detectors **11** (Fig. 1) are an appropriate photodetector for coupling to a scintillator **37** in a gamma detector **10**, especially to a CsI scintillator **53** (Fig. 4B) shaped as a rod. In view of the effective performance of silicon drift detectors in coupling to an elongated scintillation element as described by Iwanczyk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera **22** suggested by Zeng and Miraldi to specify

that the appropriate photodetectors coupled to the stack of elongated bar detector strips **106** (or to the strips themselves) was of the silicon drift detector type.

**Response to Submission(s)**

4. The amendment filed December 12, 2005 has been entered.
5. Applicant's arguments filed December 12, 2005 have been fully considered but they are not persuasive.

Applicant is unable to point to any disclosure in Zeng identifying the location of the solid-state photodetectors in their optical communication with the elongated bar detector strips **106**. Accordingly, the location is left as a choice to those of ordinary skill in the art exactly as explained by the Examiner. The reference to multiple embodiments fails to establish anything persuasive. The reference to the disclosure of photomultipliers **96, 98** in Miraldi utterly ignores the plain disclosure of solid-state photodetectors in Zeng. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

For at least the reasons explained above, Applicant is not entitled to a favorable determination of patentability in view of the arguments submitted December 12, 2005.

**Conclusion**

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Constantine Hannaher  
Primary Examiner